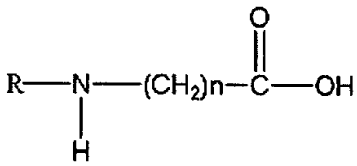
WHAT IS CLAIMED IS:

1. A method for forming a carbon nanotube pattern, comprising:

(a) surface treating a substrate to expose amino groups thereon;

(b) treating the surface-treated substrate with a linker of aminoalkylcarboxylic acid represented by the following formula 1:

Formula 1



wherein R is a functional group capable of being dissociated by an acid, and n is an integer of 1 to 50, in the presence of a coupling agent to form amide bonds between the amino groups exposed on the substrate and the carboxyl groups of the aminoalkylcarboxylic acid;

(c) applying a photo-acid generator onto the substrate, irradiating UV light to the substrate through a patterned photomask, and developing with an alkaline developer to form a positive pattern on which reactive amino groups are exposed; and

(d) reacting the reactive amino groups on the substrate with carboxylated carbon nanotubes in the presence of a coupling agent to form a carbon nanotube layer.

2. The method for forming a carbon nanotube pattern as claimed in claim 1, wherein after (d), (e) and (f) are performed one or more times to form a carbon nanotube pattern having a multilayer structure:

(e) reacting terminal carboxylic groups of the carbon nanotube pattern formed on the substrate, with an organic diamine compound, to form a diamine monolayer on the carbon nanotube pattern; and

(f) reacting the diamine monolayer with additional carboxylated carbon nanotubes in the presence of a coupling agent, to form a carbon nanotube layer.

3. The method for forming a carbon nanotube pattern as claimed in claim 1, wherein the substrate is made of glass, a silicon wafer or plastic.

4. The method for forming a carbon nanotube pattern as claimed in claim 1, wherein in (a) or (b) the surface treatment of the substrate is carried out by coating an aminoalkylalkoxysilane or aminoarylalkoxysilane onto the surface of the substrate using a spin coating, a dip coating, a spray coating, a flow coating or a screen printing process, and drying under vacuum or inert atmosphere at 10 to 150℃.

5. The method for forming a carbon nanotube pattern as claimed in claim 1, wherein the coupling agent is at least one compound selected from the group consisting of 1,3-dicyclohexylcarbodiimide, 1-ethyl-3(3-dimethylaminopropyl)-carbodiimide, benzotriazol-1-yloxytris(dimethylamino) phosphonium hexafluorophosphate and O-(7-azabenzotriazol-1-yl)-N,N,N',N'-tetramethyluronium hexafluorophosphate.

6. The method for forming a carbon nanotube pattern as claimed in claim 1, wherein the coupling agent is used along with an alkyl or aryl amine compound as a catalyst.

7. The method for forming a carbon nanotube pattern as claimed in claim 1, wherein (b) is carried out by immersing the surface-treated substrate in a solution dissolving the linker in 1 to 500 mM and the coupling agent in 1 to 500 mM, and continuing a reaction at 10 to 100℃ for 0.5 to 15 hours.

8. The method for forming a carbon nanotube pattern as claimed in claim 1, wherein the group R is t-butoxycarbonyl group, trimethylsilyloxycarbonyl group, or $-CHR_1-O-R_2$ in which R_1 is hydrogen, a saturated or unsaturated hydrocarbon group having from 1 to 20 carbon atoms, or an organic aromatic group having from 1 to 20 carbon atoms, and R_2 is a saturated or unsaturated hydrocarbon group having from 1 to 20 carbon atoms, or an organic aromatic group having from 1 to 20 carbon atoms, and R_1 and R_2 are capable of being bonded to each other to form a cyclic compound.

9. The method for forming a carbon nanotube pattern as claimed in claim 1, wherein the photo-acid generator is at least one compound selected from the group consisting of ionic photo-acid generator including $Ph_2I^+AsF_6^-$, $Ph_2I^+PF_6^-$, $Ph_2I^+TosO^-$, $Ph_3S^+SbF_6^-$, $Ph_3S^+TosO^-$, $Ph_3S^+TfO^-$, $RO-C_6H_4-N_2^+SbF_6^-$ and diphenyl iodonium salts of aromatic sulfonic acids having at least one hydroxyl group; non-ionic photo-acid generators including DNQ (diazonaphthoquinone) compounds and nitrobenzylsulfonic acids; and polymeric photo-acid generators.

10. The method for forming a carbon nanotube pattern as claimed in claim 2, wherein in (d) and (f) the reaction of the carboxylated carbon nanotubes with the amino groups of the substrate is carried out by mixing the coupling agent in 1 to 500 mM with a dispersion liquid containing 0.00001 to 1% by weight of the carboxylated carbon nanotubes, immersing the substrate in the mixture, continuing a reaction at 10 to 100℃ for 0.5 to 15 hours, and washing the substrate.

11. The method for forming a carbon nanotube pattern as claimed in claim 2, wherein the coupling agent is at least one compound selected from the group consisting of 1,3-dicyclohexylcarbodiimide, 1-ethyl-3(3-dimethylaminopropyl)-carbodiimide, benzotriazol-1-yloxytris(dimethylamino) phosphonium hexafluorophosphate and O-(7-azabenzotriazol-1-yl)-N,N,N',N'-tetramethyluronium hexafluorophosphate.

12. The method for forming a carbon nanotube pattern as claimed in claim 11, wherein the coupling agent is used along with an alkyl or aryl amine compound as a catalyst.

13. The method for forming a carbon nanotube pattern as claimed in claim 2, wherein the diamine compound is an aromatic diamine compound selected from the group consisting of 1,3-diamino-4-dihydroxybenzene, 1,3-diamino-5-dihydroxybenzene, 3,3'-diamino-4,4'-dihydroxybiphenyl, 4,4'-diamino-3,3'-dihydroxybiphenyl, 2,2-bis(3-amino-4-hydroxyphenyl)propane, bis(4-amino-3-

hydroxyphenyl)sulfone, bis(3-amino-4-hydroxyphenyl)sulfone, bis(3-amino-4-hydroxyphenyl)ether, bis(4-amino-3-hydroxyphenyl)ether, 2,2-bis(3-amino-4-hydroxyphenyl)hexafluoropropane, 2,2-bis(4-amino-3-hydroxyphenyl) hexafluoropropane, m-phenylenediamine, p-phenylenediamine, 4,4'-diaminediphenylmethane, 4,4'-diaminediphenylether, 2,2'-bis(4-aminophenyl) propane, 4,4'-diaminophenylsulfone, 3,3'-4,4'-diaminodiphenylsulfone, 4,4'-diaminodiphenylsulfone, 1,4-bis(3-aminophenoxy)benzene, 1,4-bis(4-aminophenoxy)benzene, 1,4-bis(p-aminophenylsulfonyl)benzene, 1,4-bis(m-aminophenylsulfonyl)benzene, 2,2-bis[4-(4-aminophenoxy)phenyl]propane, bis[4-(4-aminophenoxy)phenyl]methane, bis[3,5-dimethyl-4-(4-aminophenoxy)phenyl] methane, bis[4-(4-aminophenoxy)phenyl]sulfone and 2,2'-bis[4-(4-aminophenoxy) phenyl]perfluoropropane; or an alkyl diamine compound selected from the group consisting of N,N-dimethyl-1,3-propanediamine, 5-pentanediamine, diethylenetriamine, (2-aminoethyl)-1,3-propanediamine, 3,3'-diamino-N-methyldipropylamine, (3-aminopropyl)-1,3-propanediamine, spermidine, spermidine trihydrochloride, (hexamethylene)triamine, 4,4'-methylene-bis(cyclohexylamine), 4'-methylene-bis(2-methylcyclohexylamine), 2,2'-(ethylenedioxy)-bis-9-ethylamine, 9-dioxa-1,12-dodecanediamine, 4,7,10-trioxa-1,13-tridecanediamine and 4-diaminopiperazine hydrochloride.

14. A method for forming a carbon nanotube layer, comprising:

(a) surface treating a substrate to expose amino groups thereon; and

(b) reacting the amino groups of the substrate with carboxylated carbon nanotubes in the presence of a coupling agent and a catalyst to form a carbon nanotube layer,

wherein the coupling agent is O-(7-azabenzotriazol-1-yl)-N,N,N',N'-tetramethyluronium hexafluorophosphate and the catalyst is alkyl or aryl amine.

15. The method for forming a carbon nanotube pattern as claimed in claim 14, wherein after (b), (c) and (d) are performed one or more times to form a multilayer carbon nanotube:

(c) reacting terminal carboxylic groups of the carbon nanotube layer formed on the substrate, with an organic diamine compound, to form a diamine monolayer on the carbon nanotube layer; and

(d) reacting the diamine monolayer with additional carboxylated carbon nanotubes in the presence of a coupling agent, to form a carbon nanotube layer.

16. The method for forming a carbon nanotube pattern as claimed in claim 14, wherein the substrate is made of glass, a silicon wafer or plastic.

17. The method for forming a carbon nanotube pattern as claimed in claim 14, wherein in (a) the surface treatment of the substrate is carried out by coating an aminoalkylalkoxysilane or aminoarylalkoxysilane onto the surface of the substrate using a spin coating, a dip coating, a spray coating, a flow coating or a screen printing process, and drying under vacuum or inert atmosphere at 10 to 150℃.

18. The method for forming a carbon nanotube pattern as claimed in claim 15, wherein in (b) and (d), the reaction of the carboxylated carbon nanotubes with the amino groups of the substrate is carried out by mixing the coupling agent in 1 to 500 mM with a dispersion liquid containing 0.00001 to 1% by weight of the carboxylated carbon nanotubes, immersing the substrate in the mixture, continuing a reaction at 10 to 100℃ for 0.5 to 15 hours, and washing the substrate.

19. The method for forming a carbon nanotube pattern as claimed in claim 15, wherein the diamine compound is an aromatic diamine compound selected from the group consisting of 1,3-diamino-4-dihydroxybenzene, 1,3-diamino-5-dihydroxybenzene, 3,3'-diamino-4,4'-dihydroxybiphenyl, 4,4'-diamino-3,3'-dihydroxybiphenyl, 2,2-bis(3-amino-4-hydroxyphenyl)propane, bis(4-amino-3-hydroxyphenyl)sulfone, bis(3-amino-4-hydroxyphenyl)sulfone, bis(3-amino-4-hydroxyphenyl)ether, bis(4-amino-3-hydroxyphenyl)ether, 2,2-bis(3-amino-4-hydroxyphenyl)hexafluoropropane, 2,2-bis(4-amino-3-hydroxyphenyl) hexafluoropropane, m-phenylenediamine, p-phenylenediamine, 4,4'-diaminediphenylmethane, 4,4'-diaminediphenylether, 2,2'-bis(4-aminophenyl) propane, 4,4'-diaminophenylsulfone, 3,3'-4,4'-diaminodiphenylsulfone, 4,4'-diaminodiphenylsulfone, 1,4-bis(3-aminophenoxy)benzene, 1,4-bis(4-aminophenoxy)benzene, 1,4-bis(p-aminophenylsulfonyl)benzene, 1,4-bis(m-aminophenylsulfonyl)benzene, 2,2-bis[4-(4-aminophenoxy)phenyl]propane, bis[4-(4-aminophenoxy)phenyl]methane, bis[3,5-dimethyl-4-(4-aminophenoxy) phenyl]methane, bis[4-(4-aminophenoxy)phenyl]sulfone and 2,2'-bis[4-(4-

aminophenoxy)phenyl]perfluoropropane; or an alkyl diamine compound selected from the group consisting of N,N-dimethyl-1,3-propanediamine, 5-pentanediamine, diethylenetriamine, (2-aminoethyl)-1,3-propanediamine, 3,3'-diamino-N-methyldipropylamine, (3-aminopropyl)-1,3-propanediamine, spermidine, spermidine trihydrochloride, (hexamethylene)triamine, 4,4'-methylene-bis(cyclohexylamine), 4'-methylene-bis(2-methylcyclohexylamine), 2,2'-(ethylenedioxy)-bis-9-ethylamine, 9-dioxa-1,12-dodecanediamine, 4,7,10-trioxa-1,13-tridecanediamine and 4-diaminopiperazine hydrochloride.

20. The method for forming a carbon nanotube pattern as claimed in claim 15, wherein the coupling agent is at least one compound selected from the group consisting of 1,3-dicyclohexylcarbodiimide, 1-ethyl-3(3-dimethylaminopropyl)-carbodiimide, benzotriazol-1-yloxytris(dimethylamino) phosphonium hexafluorophosphate and O-(7-azabenzotriazol-1-yl)-N,N,N',N'-tetramethyluronium hexafluorophosphate.

21. The method for forming a carbon nanotube pattern as claimed in claim 20, wherein the coupling agent is used along with an alkyl or aryl amine compound as a catalyst.